



Response

TOWARDS PRAGMATIC AND FUNCTIONAL UNIT OF MIND-AND-BRAIN**IN RESPONSE TO DANKO GEORGIEV'S****"A LINKAGE OF MIND AND BRAIN: SIR JOHN ECCLES AND MODERN DUALISTIC INTERACTIONISM"****Rayito Rivera-Hernández^{1,2} and Drozdtoj Stoyanov¹**¹Department of Psychiatry and Medical Psychology, Medical University, Plovdiv, Bulgaria, ²Department of Psychobiology, University of Salamanca, Spain

*Consciousness is an enigma, perhaps the greatest enigma of philosophy of science. It can be described as a multilevel phenomenon, where transition (from unconsciousness to consciousness) is not a compromise OFF / ON in neuronal activity, but involves a complex change in nerve function, which is mediated by the environment (1). For the analysis of consciousness, the Australian philosopher David J. Chalmers distinguishes the easy problem of the hard problem of consciousness. The easy problem to analyze issues such as discrimination between sensory stimuli, the integration of information to guide behavior, verbalization of internal states, the integration of sensory information with past experience, how to focus attention, and what distinguishes waking from sleep. On the other hand, the "hard problem" of consciousness is to explain how the physical brain gives rise to consciousness. This analysis deals with the latter. **Biomed Rev 2011; 22: 85-89.***

APPROACH TO THE THEORY OF MIND-BRAIN IDENTITY

Analysis the hard problem of consciousness begins by question how the mind (thoughts, feelings, etc) can be explained in terms of what we know *as matter*? The "Identity Theory" anticipated by the British philosopher Ullin Place to "Is Consciousness a Brain Process" in 1956, and John Smart with "Sensations and Brain Processes" in 1959, says that perceptions and consciousness are physical processes in the brain, just as the rainbow is a physical process in the atmosphere (appearance of a spectrum of different light frequencies on the sky) (2,3).

Smart and Place propose that mental processes are identical to brain processes, if and only if, mental states are something material - but not behavior, that should be assumed is identical to the internal physical states (4). But if the mind is ultimately matter, then how is it built? They identify conscious states with brain states, which raises the question: where interaction occurs between these states? Since conscious states and physical states are the same thing, there is no need to interact. They "become" together.

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Joy, for example, is a physical state (because the body produces dopamine, endorphins, oxytocin and serotonin) and conscious (produces shiny inner state) that causes some actions that are both states, physical and conscious (general welfare is generating high levels of energy and a strong willingness to constructive action, which the person who experiences it, reveal in their appearance, language, decisions and actions) (5). Related in this context, the concept of identity makes the conscious brain “primary and reflective” will be equal to mind.

Danko Georgiev in his Commentary in the present volume of *Biomedical Reviews* (6), states that it has been suggested in our *Dance Round* “... that the mind-brain identity thesis applies to “events of sensations” and “distributed processes in the brain”. Such a definition however is vacuous. There are various distributed processes in the brain that do not produce conscious experiences. Furthermore, the events of sensations are by definition mental and to say that conscious experiences are associated with brain states or processes that produce sensation is circular” (6,7).

On the contrary, Capra (8) distinguishes two types of consciousness: (i) primary consciousness, which is the direct experience of perceptions, sensations, thoughts and memory contents and images, dreams and daydream, and (ii) reflective consciousness that is the conscious experience per se. The latter is necessary for self-consciousness, which involves realizing being a unique individual separate from others, with a personal and future history. The reflective consciousness includes the process of integration, namely, to observe one’s own mind and its functions, in other words, know we know.

While it is true that the conscious experience in the normal adult human consciousness involves both primary and reflective consciousness, in this context we should argue that conscious experience is not always associated with brain states or processes that produce sensations. Therefore, the statement “to say the events of sensations are by definition mental and to say that conscious experiences are associated with brain states or processes that produce sensations is circular” is not always correct.

According to the American philosopher David Lewis in his *An argument for the identity theory*, and the Australian philosopher David Malet Armstrong the theory of identity might be extended to all that is mental, “not only awareness and perceptions: all states mental are physical states in the brain, all mental processes are brain processes” (9). Therefore, the mental processes are playing a “causal role”: a mental state (e.g. happiness) can cause behavior, and it does because it is

a brain state.

According to Hillary Putnam’s argument not only humans but also for example, amphibians, or aliens if any, may have feelings. However it seems unlikely that all beings with the same feelings are in the same brain state: if this is not the case, then feeling can not be identical to a particular brain state. On this basis he argues that the identity theory lacks empirical foundation (10). “Even if it happens that a particular brain state is bound in each case with a single “mental state” in a person, the absolute correlation between mental state and brain state does not necessarily mean that both states are in fact one and the same” (10).

Further query is whether a state of mind (which is a brain state) is caused by and/or causes behavior. For example, the rainbow is not the only physical process of the atmosphere, but is caused for this physical process (the sun’s rays suffer a breakdown when crossing water droplets contained in the atmosphere). Then, a mental state is defined by its causal role: what caused the mental state, which produced in turn for this mental state, and its relationship to other mental states. As we can see, consciousness is not a passive phenomenon in response to stimuli, but an active process of interpretation, construction and re-interpretation of data (11).

THE PROBLEM OF EVOLUTIONARY CAUSALITY.

According to the theory of evolution, things that are not causally effective not lead to evolutionary advantage and can not be perpetuated by natural selection (12). The theory of mind-brain identity is an attempt to resolve this issue, and argues that mental states are brain states, which make mental states are causally effective and capable of producing evolutionary advantage (12). This type of causality exemplifies very well the behavior of elementary physics particles that are governed by the wave function as it has been demonstrated in the *BMR Commentary* by Danko Georgiev (6 and references therein).

The individual particle can not have a single wave function because wave function can be found in an infinite number of possible states in the multidimensional-material space of Hilbert, where each axis represents a possible state. Ie, the particle may be in infinite states, and hence the Hilbert space is of infinite size. At this time, the particle is an unobservable mental state, described as “the time before being detected probabilistically.”

When the individual particle interacts with other particles, each of these “possible states” is selected to be updated (determined), ie a system of interacting particles creates a wave

function (which depends on the boundary conditions, which include the initial position of the particle and its environment), so the new position of the particle and the new environment will serve as a condition for determining the position of the particle through the Schrodinger equation.

Sir John Eccles suggests that mental events are caused in the brain in a way analogous to how the wave function makes a particle being in a particular position at any given time, and asserts that consciousness can have different levels of complexity formed from simple mental properties attributed to quantum particles. As the quantum laws are indeterminate, it is possible to construct a theory in which the mind and brain states interact: brain states deterministically produce a mental state, mental state makes a choice of multiple indeterministic alternatives and selects a mental state in the future. This argument would explain why not all brain states cause mental states, why there are mental processes that do not accompany any behavior, and why there are mental states that seem to involve other mental states. Based on the foregoing, we affirm that interactionist dualism presented by Georgiev is not necessarily a dualistic view in the classic sense, but should be considered rather as a new type of non-reductive physicalism, which is to argue that it is not necessary to postulate for the soul or mind a second metaphysical entity. For this position, the soul or mind are physiologically expressed or embodied in our person. This proposal is intended to reconcile our views on body, soul, mind and brain. To that end we agree with the basic requirements of the presented model.

VALIDITY OF SCIENTIFIC RESEARCH OF CONSCIOUSNESS

In the research of consciousness, the validity has two main tasks: (i) the development and refinement of theoretical approaches of consciousness, which we have discussed in the preceding paragraphs, and (ii) the construction of instruments and procedures for measurement of the consciousness, which we discuss in the next part.

A reliable measure is measuring a construct consistent over time, people and situations, it is also one that measures what it purports to measure (13). A measure can be reliable without being valid. Therefore, the reliability is necessary but not sufficient to prove the validity (14). In research on consciousness, as in other studies, internal and external validity seem to contradict each other (14,15). To get an experimental design you have to control for all interfering variables. That's why you often conduct your experiment in a laboratory setting. While gaining internal validity (excluding interfering variables by

keeping them constant) you lose ecological or external validity because you establish an artificial lab setting. On the other hand with observational research you can't control for interfering variables (low internal validity) but you can measure in the natural (ecological) environment, at the place where behavior normally occurs. However, in doing so, you sacrifice internal validity (14,15).

The apparent contradiction of internal validity and external validity is, however, only superficial. The question of whether results from a particular study generalize to other people, places or times arises only when one follows an inductivist research strategy. If the goal of a study is to deductively test a theory, one is only concerned with factors which might undermine the rigor of the study, i.e. threats to internal validity (14,15). One particular implication entailed from the interactionist perspective as exposed above is related to the poor validity of that model when applied for instance to the cases of shared psychiatric and neuroscience taxonomy (16).

OUR CONTRIBUTION

We propose a change in concept between the "mind-brain dissociation", for "pragmatic and functional unit mind-brain", without the pretense of the eliminativist reduction. Here we argue that interactionist dualism proposed by Karl Popper and John Eccles, where mind, though different from the material brain, interacts with the brain and depends upon it, is based on the principle that mind and matter are "substances" different from each other (material and immaterial substance), affirmation that for several centuries has been ruled out by face with the problem of the need for the existence of a place of interaction between "such substances" (17).

By mentioning that the interactionism was refuted for over 40 years, we refer that before reading the work of Eccles - *The Understanding of the Brain* (1973) - most neuroscientists intuitively had perceived a gap between mental and physical phenomena, which caused dualistic views that were replaced by purely materialistic positions, trying to better respond to questions such as where are performed the mental processes (17).

Moreover, we underline that one of the shortcomings of dualism was to propose the existence of mind-body like two supreme principles, uncreated, contours, independent, irreducible and antagonistic, and maintain the separation of an intelligible world of ideas, eternal, immutable and necessary, of the sensible world of matter, temporal, mutable and corruptible (soul encased in a body) delineating two orders

that claimed to be “essentially different”. We believe this radical distinction between ideal and real being, normality and disease, between well thinking, and the thinking like the influences of the individual surroundings, restricts freedom of conscience and freedom for diagnosis, from the point of view that conscious activity assessment must be holistic and multi-influenced (17).

Although Karl Popper in his model of “demarcation of science” takes the psychoanalysis as an example to demonstrate the principle of falsifiability and qualifies as pseudoscience, he argues that it is rational and valuable as well. Remarking that a theory may well be meaningful without being scientific, and as such, “significance criteria” may not necessarily coincide with a “criterion of demarcation”, proposing that falsifiability is a property of statements and theories, and in itself is neutral.

Returning to the dilemma between dualism and materialism, we speak in favor of materialism as a driver of a new philosophy that is proclaimed as a science by neurosciences and psychiatry, called to find out the truths that help with life skills and values guide, offering new ways to validate research and new methods to know the truth.

Similarly, we agree that the cure is independent of the method, but sometimes is not independent of conditions under which the method of healing is applied. We propose that stereotypes hinders diagnosis, we believe it is necessary to give answers to the reasons that hinder the lack of recognition, care and access to treatment for psychological problems in real people, so we argue that to improve the practice of psychiatry, the scientist needs to forget the point of view of all proposals that are reductive: mental states can not be reduced to behavior, brain states or functional states, but must be referred depending on the complexity of the individual (18).

This supports the eliminativist view that considers possible to reject the mind-body problem, because we think that it is wrong to ask how they fit the mental states and biological factors. We suggest that more should be accepted that human beings can be described in various ways: for example, mental or biological terms (19).

On the other side, from a purely scientific point of view, we consider that the “hard problem” of consciousness, namely, the physical processes that give rise to brain consciousness must be based on the special quality of what we call “mental”, where there must be something that is, for that body, from the point of view that constitutes the first person perspective. This is critical because it allows us to see the deficiencies in other definitions of philosophy of mind; such as it is the dispositional

mental or mental is functional, and so on. If it were simply a mental gear in a chain of more functional processes: neurophysiological, chemical, mechanical, etc., then any being that had implemented an algorithm and the necessary parts could perform these functions, such as a robot (20).

We also argue that materialism is far from being able to answer the “hard problem”, as the subjective experience of consciousness means, ie the opposite of objectivity. In some writings of consciousness is considered synonymous with mind. However the mind includes unconscious mental processes (20).

We argue that consciousness is not a passive phenomenon in response to stimuli but an active process of interpretation and construction of external data memory, relating them in this context, we refer to “type of identity,” which makes the conscious brain (primary and reflective) will be equal to mind. It also refers to Anglo-Saxon literature that uses two different words, in Spanish is often translated as consciousness. The first is “awareness”, which translates into apperception; the second is “consciousness”, which translates into consciousness. This distinction is important because there is the English expression “unconscious awareness” which translates to “unconscious apperception.” Some authors define apperception as a state in which we access to information which can be used to control behavior (1, 20).

On the other hand, in that current alternative version called the “pragmatic and functional unit mind-brain,” we propose that if the mind is the function performed by the brain, mental states would then be functional states, only if mental states are states functional regardless of specific brain states that occur. This supports the proposal by John Searle who insists that we must keep in mind that consciousness is caused by brain processes, but can not be reduced to these processes because it is a phenomenon of “first person”, or subjective, while the brain processes are phenomena of “third person”, i.e. objective ones (21,22).

We also address the evolutionary argument against epiphenomenalism, that if consciousness is a sequence of conscious mental states and each of these states experiences some specific content, then consciousness must have had an evolutionary purpose. We refer at this point to Nicholas Humphrey, who claims that *it is conscious to have feelings, as opposed to perceptions*. Although in evolution some states are full of affection (feelings) and other neutral with respect to the feelings (perceptions), both are enhanced by natural selection (mental Darwinism) (23).

Finally, we maintain our position on pragmatism of function, in order to help psychiatry to improve the validity of diagnosis of mental disorders, considered as the product of brain activity.

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